

## INFORMATION SHEET

ORDER NO.

SUTTER GOLD MINING COMPANY, US ENERGY CORP, AND PROPERTY OWNERS  
LINCOLN MINE PROJECT  
CONSTRUCTION OF WASTE PILES AND EXPANDED MINING OPERATIONS  
AMADOR COUNTY

The Sutter Gold Mining Company, a subsidiary of U.S. Energy Corp., submitted a Report of Waste Discharge to reopen an existing underground gold mine. The mine will be owned and operated by Sutter Gold Mining Company. The 574 acres of land which makes up the mine property are owned by Sutter Gold Mining Company and a number of other identities (listed in Finding No. 3). These land owners are jointly referred to as the "Property Owners." For purposes of this Order, Sutter Gold Mining Company, U.S. Energy, and the Property Owners are jointly referred to as "Discharger."

This proposed underground gold mine and processing facility will generate both liquid and solid waste streams that pose a threat to water quality. The underground mining will remove highly mineralized ore veins along with the surrounding host rock. Following the blasting, the newly fragmented waste rock and host rock with ore will be loaded into carts for transportation to two lined processing piles near the mill. The waste rock will be separated from the ore and placed on a lined waste pile. The host rock with ore will then be crushed and the high-grade ore will be concentrated for metals separation at another facility (outside the state of California). The remaining material will be separated based on size for two different disposal procedures. The finer mine waste material (less than 325 mesh) will be slurried and then conveyed through a pipeline to a seven-acre waste pile (surface fill unit) for discharge. The waste material greater than sand size (greater than 325 mesh) will be encapsulated in a 5% Portland cement slurry and placed in the underground workings as an engineered structural support in the excavation from which the ore has been extracted (stope).

The Sutter Gold property is within the western Mother Lode gold district of the Sierra Nevada Mountains. The local relief of the property is approximately 400 feet, which is an estimate of the change in elevation from above the proposed tailings pond to the lowest point beneath the mill area. The present mine workings consist of the Stringbean Alley Decline, a 2,850 foot long tunnel that is a 12 foot high by 15 foot wide tunnel with a 12% decline. From this decline, approximately 1,700 feet of tunnels branch out in which numerous exploration holes have been drilled.

### **Waste Characterization**

The country rock, which is mine waste rock, is classified as a Group B mining waste. This material will be placed on a Title 27-engineered lined waste pile. The two other waste streams (less than 325 mesh and greater than 325 mesh) are also considered mining waste rock after the high-grade ore is removed. This waste material is none acid generating. However, gold deposits in the 'California Mother Lode' are associated with sulfide ore bodies containing elevated metals such as arsenic, nickel, and selenium. Dewatering of mines, and bringing ore and wall rock to the surface, exposes (a) the underground workings, (b) the surrounding rock formations, and (c) the mined material to oxygen. This causes the sulfide minerals to oxidize, making their associated metals soluble and producing salts such as sulfate. These metals and salts are then available to dissolve into water posing a significant threat to groundwater and surface water quality. Because of the time it takes for sulfide minerals to

oxidize and the extended water contact time at the mine, the standard analyses completed as part of the RWD do not accurately represent the threat to water quality. However, based on the February 1999 U.S. EPA document "*Characterization of Mine Leachate and the Development of a Ground-Water Monitoring Strategy for Mine Sites,*" and on impacts seen at other mines in the Mother Lode, the mining and mine waste at this site could or will produce nonhazardous soluble pollutants at concentrations which exceed water quality objectives. Therefore, both waste streams are Group B mining waste. Group B mining waste, as defined in Title 27, is "mining wastes that consist of or contain nonhazardous soluble pollutants of concentrations which exceed water quality objectives for, or could cause, degradation of waters of the state".

### **Group B Mining Units**

The country rock will be placed onto an engineered liner that complies with Title 27. This design of this unit is equivalent to the prescriptive standard described in Chapter 7 of Title 27. The design of the waste pile consists of, from the top down:

- a. 12-inches of poorly graded gravel, or equivalent with 4-inch schedule 80 perforated drainpipes wrapped in a single layer geo-fabric as a leachate collection and recovery system.
- b. 12-inches of clay at a relative compaction of 90 percent, or equivalent with a minimum hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec.
- c. 12-inches of poorly graded gravel, or equivalent with 2-inch schedule 80 perforated drainpipes wrapped in a single layer geo-fabric as a leachate collection and recovery system.
- d. An engineered compacted subgrade having all slopes rolled with a smooth drum compactor to eliminate soft spots and protruding rocks.

All leachate derived from the waste rock pile will be drained and captured in a HDPE single lined detention basin. Once captured, the water will be immediately returned to the mill for use in the ore extraction process.

The less than 325 mesh mining waste is being placed as slurry into a Group B mining waste pile unit (surface fill unit). This design of this unit is equivalent to the prescriptive standard described in Chapter 7 of Title 27. The design of the surface fill unit consists of, from the top down:

- a. A blanket leachate collection and removal system, designed constructed and operated in compliance with Title 27 Subsection 20340;
- b. A geomembrane liner;

- c. A geosynthetic clay liner;
- d. A nonwoven geotextile; and
- e. An engineered compacted subgrade having all slopes rolled with a smooth drum compactor to eliminate soft spots and protruding rocks prior to installation of the nonwoven geotextile.

For the greater than 325 mesh mining waste, the Discharger has proposed an engineered alternative to the prescriptive liner requirement of Title 27 Group B containment. The Discharger will encapsulate the material in a 5% concrete slurry and place it in the underground workings as an engineered structural support in the stopes. The dimensions of each encapsulated block will be approximately 200' long, 9' in height and 4' to 10' wide. The actual size of each structural block will be dependent of the size of the mineralized zone. These blocks will be stacked on top of each other as a support column. A geonet drainage layer will be placed between the blocks to allow for drainage. Any standing water will be removed and returned to the mill as process water or discharged to land under Waste Discharge Requirements Order No. 99-035 (or subsequent Order). The addition of 5% concrete slurry to the waste will prevent any significant water flow through the waste and affords equivalent protection against water quality impairment to the prescriptive standard.

### **Other Issues**

#### **Dewatering the Underground Mine Workings**

During mining activities, the groundwater table will be lowered through pumping. This activity will allow the wall rock and the ore zone to react with oxygen, forming oxides. This is typical of acid mine drainage reactions. However, the wall rock in this area has carbonate minerals, which buffer the low pH generation. If groundwater is allowed to rise back up after mining ceases, the groundwater will come into contact with the oxidized wall rock and ore zone and will dissolve these oxides. This will cause an increase in salts and metals (such as sulfate and arsenic), degrading the groundwater.

This Order requires the Discharger to dewater the mine indefinitely to prevent groundwater from rising back into the mine and into the surrounding wall rock, causing the oxidized minerals to dissolve into groundwater. The Discharger has stated that groundwater flows are very low in this area because of the massive nature of the surrounding formations, and has provided evidence that sustained groundwater yield in this area is below 200 gallons per day. However, additional data is required to support this assertion. If at some time in the future, the Discharger determines that it no longer wishes to dewater the mine in perpetuity, then it may elect to submit a proposal to amend the Basin Plan to de-designate the local groundwater's municipal supply beneficial use. If the Regional Board adopts a Basin Plan amendment and revises the WDRs, then the Discharger would be allowed to cease dewatering the mine. However, if and until this happens, the mine must be dewatered.

#### **Water Quality Protection Standards**

Water quality protection standards per Title 27 have not been established for either of the Group B mining waste units. This Order requires water quality protection standards be established before any

waste is discharged into these units and will consist of the list of constituents of concern (under section 20395), the concentration limits (under Title 27 section 20400), and the Point of Compliance and all Monitoring Points (under section 20405). This Water Standard will apply during the active life of the Units, the closure period, the post closure maintenance period, and during any compliance period (under section 20410). Furthermore, these values will represent background water quality for both groundwater and surface water.

### **Reopener**

Requirements for discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. Additional information must be developed and documented by the Discharger as required by schedules set forth in the proposed Order. As this additional information is obtained, decisions will be made concerning the ability of the Sutter Gold mining facility to comply with the requirements of discharge. If controls and treatment prescribed by the proposed Order prove insufficient to maintain compliance, Sutter Gold will be required to modify its operations or cease discharge. If modifications represent a significant change to mining operations or design of the mining waste management units, then this will be sufficient basis for reopening the proposed Order.

VJI/WSW: 10/3/05